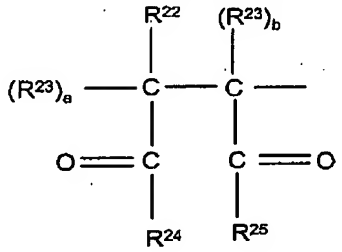
REMARKS

The Office Action mailed June 15, 2007 has been carefully considered together with each of the references cited therein. The amendments and remarks presented herein are believed to be fully responsive to the Office Action. Accordingly, reconsideration of the present Application in view of the following remarks is respectfully requested.

Applicant has amended the claims to more clearly recite what Applicant believes to be the invention. In claim 1, Applicant has replaced the term "low-temperature-stabilized solution" with the term -- low-temperature-stabilized liquid solution--. Support for this amendment may be found in Applicant's Specification in paragraph [00011] wherein it states that the additives of the instant invention remain homogeneous and flowable, and in Table 3 wherein it shows that the additives of the instant invention are "liquid" at storage stability testing conditions. In claims 13-17, Applicant has changed the dependency from claim 11, now canceled, to claim 7. Support for the amendments to claims 13-17 may be found in Applicant's specification and in originally filed claims 13-17. Support for new claim 18 may be found in paragraphs [009], [0011], and [0012]. It is believed that no new matter is introduced by these amendments. Claims 7, 11-17 are pending in the application.

Applicant's invention relates to the discovery of a composition which transforms concentrated fatty acid additive mixtures which are typically solid at temperatures from 0°C to -5°C into flowable, storage-stable liquid solutions at low-temperatures (See Applicant's Specification in Table 3). The advantage provided by such flowable, homogeneous liquid concentrates is the ability to mix the concentrates with middle distillates at low temperatures without requiring the heating of the target fuel oil or the additive concentrate in preparation for the mixing operation. The result is a significant energy saving during the blending operation. Adding additives to middle distillate fuels prior to Applicant's invention required the oil be heated to insure even dispersion of the additive in the fuel oil. The instant application is directed to a low-temperature, storage stable liquid additive

concentrate comprising fatty acids and a particular polar nitrogen compound, wherein the polar nitrogen compound comprises 20 to 80 mol-% of a divalent structural unit as recited in claim 1 according to formula 12 :



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The additive concentrate is useful for improving the lubricity of low-sulfur middle distillate fuel oils. More particularly, Applicant's invention relates to a storage stable and homogeneous liquid additive mixture which can be used to improve the lubricity of a low sulfur middle distillate at a low blending temperature; i.e., at or below a temperature of 0°C, without the need to store or dispense the additive in greatly diluted form and without the need to combine the additive concentrate with middle distillate in heated storage tanks and lines to provide the desired improvement and to dissolve the additive in the middle distillate.

Applicant would like to thank the Examiner for the opportunity to discuss the merits of the application in a telephonic interview with Applicant's representative Mr. Silverman on 29 August 2007. In the discussion, Mr. Silverman pointed out the consistency between the data presented in the Declaration under 37 C.F.R. 1.132 by Dr. Krull and Applicant's claim 7, which is drawn to a low-temperature-stabilized additive liquid composition which comprises from 1-80% of a solvent, a mixture of saturated and unsaturated fatty acids, and a specific polar nitrogen compound. In Table 1 of the Declaration, the compositions of examples 1-17 are not fuel oils, but are mixtures of fatty acids and cold flow improvers. The pour points and cloud points disclosed in Table 1 of the Declaration refer specifically to the flow properties of the indicated additive mixtures, and do not refer to any flow properties of fuel oils containing such additive mixtures. In contrast to the instant invention, the Krull '632

Patent only discloses a polar nitrogen compound for improving the cold flow properties of a low-sulfur fuel oil, and Krull further discloses that the polar nitrogen compound can be combined with other additives as part of a fuel oil mixture, not an additive concentrate comprising fatty acids. In Table 1 of the Declaration, Dr. Krull showed in a side-by-side comparison that a mixture of a fatty acid with the polar-nitrogen cold flow improver compound characterized as recited in Applicant's claim 7, surprisingly reduced the pour point of the fatty acid/flow improver mixture, while other well-known cold flow improvers such as those disclosed in the JP reference (JP11-001692) all increased the pour point of the resulting mixture of the fatty acid and the other cold flow improvers (B9, B10 &B11). In Table 2, only the cloud points (the temperature at which crystals form in the mixture) of the fatty acid/polar-nitrogen mixture improved, while the cloud points of the mixtures of fatty acid and other cold flow improvers (B9, B10 &B11) remained essentially unchanged. In Table 3 of the Declaration, the only mixtures of fatty acid and cold flow improver which remained liquid were the fatty acid/polar-nitrogen compound blends. This response was clearly unexpected.

Claims 11-16 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The rejection of claims 11-16 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement is now moot in view of Applicant's cancellation of claim 11 and the above amendments to claims 12-16 to depend from claim 7.

Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over JP 11001692 in view of Krull (US 5,391,632). The rejection of claim 7 as amended under 35 U.S.C. §103(a) as being unpatentable over JP 11001692 should be withdrawn for the reason that JP 11001692 does not disclose an additive containing a mixture of fatty acids and the polar nitrogen-containing terpolymer compound claimed by the applicant, and no one skilled in the art would be motivated to employ Applicant's specific terpolymer based on the combination of the JP 11001692 disclosure of fatty acids and the general teachings of the US 5,391,632 reference for improvement of cold flow properties of fuel oils to arrive at Applicant's low-temperature-stabilized liquid solution.

There is no disclosure in the JP reference of a storage stable, flowable liquid additive mixture which does not include middle distillates. The JP reference discloses that fatty acids as well as cold flow improvers can be incorporated into a fuel oil as a concentrate , but the JP reference is silent on the use of any of Applicant's specific terpolymers which are nitrogen-containing compounds for the improvement of the cold flow properties of fatty acids. The JP reference does not teach any iodine number of the mixture of the fatty acids. The JP reference does not teach or suggest that any nitrogen-containing polymers must be present in the additive in an amount of from 0.01 to 90% by weight, based on the total weight of the fatty acids and the nitrogen containing compound A1), A2) and B). The Examiner alleges that it would be obvious to anyone skilled in the art based on the disclosure of Krull ('632 at column 2, lines 21-32, shown hereinbelow) to combine the nitrogen-containing compounds of the '632 Patent which discloses the terpolymer paraffin dispersant with "other cold temperature fluidity improvers" for use in middle distillate fuel ois.

> It has likewise been found that addition of alcohol/amine-modified terpolymers based on α,β-unsaturated dicarboxylic anhydrides, α,β-unsaturated compounds and polyoxyalkylene ethers of lower unsaturated alcohols, if desired in admixture with known paraffin inhibitors, preferably copolymers based on ethylene and vinyl acetate, results in the paraffin crystals which precipitate on cooling remaining dispersed. As a result of this uniform dispersion, a homogeneously turbid phase is obtained in which the CFPP (cold filter plugging point) value, which is critical for operability, of the upper and lower phases is approximately the same.

The '632 Patent discloses the combination of the terpolymer polar nitrogen containing paraffin inhibitor with other "known paraffin inhibitors" and specifically mentions copolymers based on ethylene and vinyl acetate. Nowhere in the '632 Patent or in the JP reference are fatty acids disclosed as paraffin inhibitors. In fact, fatty acids do not function as paraffin inhibitors, but tend themselves to crystallize at low temperatures giving rise to handling problems. (See Applicant's Specification at paragraph [009]). No one skilled in the art based solely on this disclosure in the '632 would be motivated to combine fatty acids, and in particular the mixture of fatty acids which are disclosed in the JP reference (See paragraphs [0018] and [0019]) to be lubricity improvers, not paraffin inhibitors, with the paraffin inhibiting terpolymers disclosed in the '632 Patent for the purpose of creating a low-temperature storage

stable, flowable liquid additive mixture. The prior art references must be read as a whole and consideration must be given where the reference diverge and teach away from the claimed invention. No one skilled in the art would be able to combine any of the teachings of the JP and '632 references to render the instant invention obvious without the improper use of hindsight.

Furthermore, Applicant has demonstrated in Applicant's Specification in Tables 1 the unexpected improvement in the cold flow properties of the liquid fatty acid additive for the claimed combination. In Tables 3 and 4, Applicant demonstrated the unexpected improvement in storage stability for the claimed fatty acid mixtures compared to the storage stability of the individual components. For example in Table 1, compare Example C2, a mixture of oleic and linoleic fatty acids (A2), and C3, a polar nitrogen compound being a product of a terpolymer of C_{14}/C_{16}-alpha-olefin, maleic anhydride and allylpolyglycol with 2 equivalents of ditallow fatty amine in a 50% by weight naphtha solution (B1), with Examples 13-15, according to the subject application. Note that the pour points of C2 and C3 were 6 and 9, respectively, with the pour points of Examples 13-15, representing compositions of 80/20 to 20/80 wt-% of the fatty acid mixture to the polar nitrogen compound having pour points of -27 to -54 °C. In Table 3, Examples 39 and 40 showed that additive concentrate mixtures of 20/80 and 80/20 remained liquid after 3 days at -20 °C, while individual components A2 and B1 shown as Examples C9 and C10 showed that at -20°C, the individual A2 and B1 components were both solid. In Table 4, Examples 43-48, compared to Example C13 showed that without any of component B1 in fatty acid mixture A1, having an Iodine Number of 155 g of I/100g, that A1 always produced a sediment, while Examples 43-48 representing increasing proportions of B1 ranging from 100 to 50,000 ppm in the additive concentrate showed no sediment over 7 days at -20°C, and no sediment after 1 day at -28°C.

Still further, attached to this response is a Declaration submitted by Dr. Matthias Krull, one of the named inventors of the subject application, under 37 C.F.R. 1.132 which presents additional data showing a side-by-side comparison of the present invention with combinations of fatty acids and cold flow improvers such

as disclosed in the JP Reference and compositions of fatty acids and the polar nitrogen-containing compounds disclosed as B1 in Applicant's Specification. A variety of cold flow improvers selected from the list of materials which were disclosed in the Japanese reference (JP 11-001692) were tested in comparison to the polar nitrogen-containing compound B1) of the subject application to assess the cold flow improvement of fatty acid mixtures and their solutions in organic solvents. The materials used were the following:

Fatty Acids:

A3) Tall oil fatty acid comprising 29 % oleic acid, 64 % linoleic and other polyunsaturated acids and 3 % of saturated acids. Iodine number 158 gI/100g. (similar to A1 of the subject application)

A4) Oleic acid (technical grade) comprising 67 % oleic acid, 11 % linoleic acid, 5 % of hexadecenoic acid and 12 % of saturated fatty acids. Iodine number 85 gI/100g. (similar to A2 of the subject application)

Polar Nitrogen-Containing Compound:

B1) Product of the reaction of a terpolymer of $C_{14}/_{16}$-α-Olefin, maleic anhydride and allylpolyglycol with 2 equivalents of ditallow fatty amine, 50 % active in aromatic naphtha. This is the same polar nitrogen-containing compound as disclosed as B1 in the subject application.

Other Typical Cold Flow Improvers:

B9) EVA copolymer (27 wt.-% vinyl acetate, molecular weight of 13.000), 50 % active in aromatic naphtha (comparison).

B10) Poly(tallow fatty ester of acrylic acid) (molecular weight of 75.000), 50 % active in aromatic naphtha (comparison).

B11) Behenic acid diester of poly(ethylene glycol) with molecular weight 600, 50 % active in aromatic naphtha (comparison).

In order to compare the differences between the low-temperature properties of compositions according to the subject application with fatty acid compositions

containing fatty acids and other cold flow improvers (for example: B9, B10 and B11), the pour points (see Table 1), cloud points (see Table 2) and storage stabilities (seeTable 3) of these compositions were assessed. Pour points were measured in accordance with ISO 3016 and cloud points were measured in accordance with ISO 3015. The additives mixtures were then stored for 24 hours at -20 °C, and subsequently assessed visually (Table 3). (C) denotes comparative examples.

Table 1: Pour points of the additives

Example	Composition (parts by weight)					Pour Point [°C]
	A1	B1	B9	B10	B11	
1	80	20				-9
2	50	50				-27
3	20	80				-3
4 (C)	80		20			0
5 (C)	50		50			3
6 (C)	20		80			+12
7 (C)	80			20		-3
8 (C)	50			50		6
9 (C)	20			80		+15
10 (C)	80				20	0
11(C)	50				50	+12
12 (C)	20				80	+18
13 (C)	100					-6
14 (C)		100				+9
15 (C)			100			+18
16 (C)				100		+15
17 (C)					100	+21

Table 2: Cloud Points of the fatty acid solutions
For these examples the fatty acid was used as a formulation containing 50 % by weight of fatty acid in aromatic naphtha

Example	Composition (parts by weight)					Cloud Point [°C]
	A1	B1	B9	B10	B199	
18 (C)	100					-28.5
19	99,95	0,05				-34.0
20	99,8	0,2				-35.0
21	99,5	0,5				-33.5
22 (C)	99,8		0,2			-27.5
23 (C)	99,8			0,2		-29.0
24 (C)	99,8				0,2	-27.0

Table 3: Storage stability of the additives (storage for 24 hours at -20°C)

Example	Composition (parts by weight)					Assessment
	A2	B1	B9	B10	B11	
23 (C)	100					solid
24 (C)		100				solid
25 (C)			100			solid
26 (C)				100		solid
27 (C)					100	solid
28	80	20				liquid
29	50	50				liquid
30(C)	80		20			viscous gel
31 (C)	50		50			solid
32 (C)	80			20		viscous gel
33 (C)	50			50		solid

34 (C)	80				20	solid
35 (C)	50				50	solid

The resulting lower pour points of the fatty acids combinations with component B1, according to the subject application, over a broad range of concentrations clearly show that the additives disclosed in the subject application can be handled and used at much lower temperatures than neat fatty acids or fatty acids which were combined with other cold flow improvers. Similarly, after dilution of the fatty acids with solvent, the onset of crystallization as determined by the cloud point (See Table 2 hereinabove) can be shifted to lower temperatures by introducing the additive components of the subject application. Thus, additive concentrates comprising fatty acids, solvent and minor amounts of Applicant's polar nitrogen-containing compounds, according to the subject application, can be stored and handled at lower temperatures than neat fatty acid solutions or fatty acid solutions containing other flow improvers without the risk of sediment formation or filter blocking. Furthermore, the above results show that compared to combinations of the fatty acids and any other well-known cold flow improvers of the Japanese Reference, the fatty acids when combined Applicant's polar nitrogen-containing compounds, according to the subject application, do not gel or solidify during prolonged storage at low temperatures. Thus, the additive concentrates of the subject invention can be handled and used without prior heating or dilution, even after storage at low temperatures. These measurements show the superior properties of the claimed additive concentrates for stabilizing fatty acids at low temperature in comparison to other known middle distillate cold flow improvers cited in the Japanese Reference (JP 11-001692). No one skilled in the art could have predicted this surprising and unexpected performance in storage stability of the concentrated additive of the instant invention based on any combination of the JP reference or the '632 Patent. Therefore, the rejection of claim 7 as amended under 35 U.S.C. §103(a) as being unpatentable over JP 11001692 in view of US Patent 5,391,632 should be withdrawn for the reason that the JP 11001692 reference by requiring a middle distillate component teaches away from applicant's invention or is a best silent on

any combination of the specific terpolymer/polar nitrogen-containing compound with a mixture of fatty acids in the form of a storage stable concentrate, and no one skilled in the art armed with the JP 11001692 reference or the '632 Patent, taken separately or together, would be motivated to arrive at applicant's invention by combining a mixture of fatty acids for lubricity improvement with a paraffin inhibitor as disclosed in the '632 Patent, based solely on the above disclosure in the '632 Patent which refers only to further paraffin inhibitors, not lubricity improvers. Furthermore, Applicant has shown unexpected results which demonstrate the storage stability and superior cold flow properties of the claimed combination which is superior to that of the individual components and to other flow improvers.

The rejection of Claims 11-17 under 35 U.S.C. §103(a) as being unpatentable over JP 11001692 in view of US Patent 5,391,632 is now moot in view of Applicant's cancellation of claim 11 and the above amendments to claims 12-16 to depend from claim 7.

The rejection of Claims 13-17 under 35 U.S.C. §103(a) as being unpatentable over JP 11001692 in view of US Patent 5,391,632 should be withdrawn for the reasons given in support of amended claim 7, from which they now depend.

New claim 18 depends from amended claim 7 and should be allowable for the reasons given in support of claim 7.

An early and favorable action on the merits is respectfully requested. The Commissioner is hereby authorized to charge any fee deficiency to Deposit Account No. 03-2060.

Respectfully submitted,

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